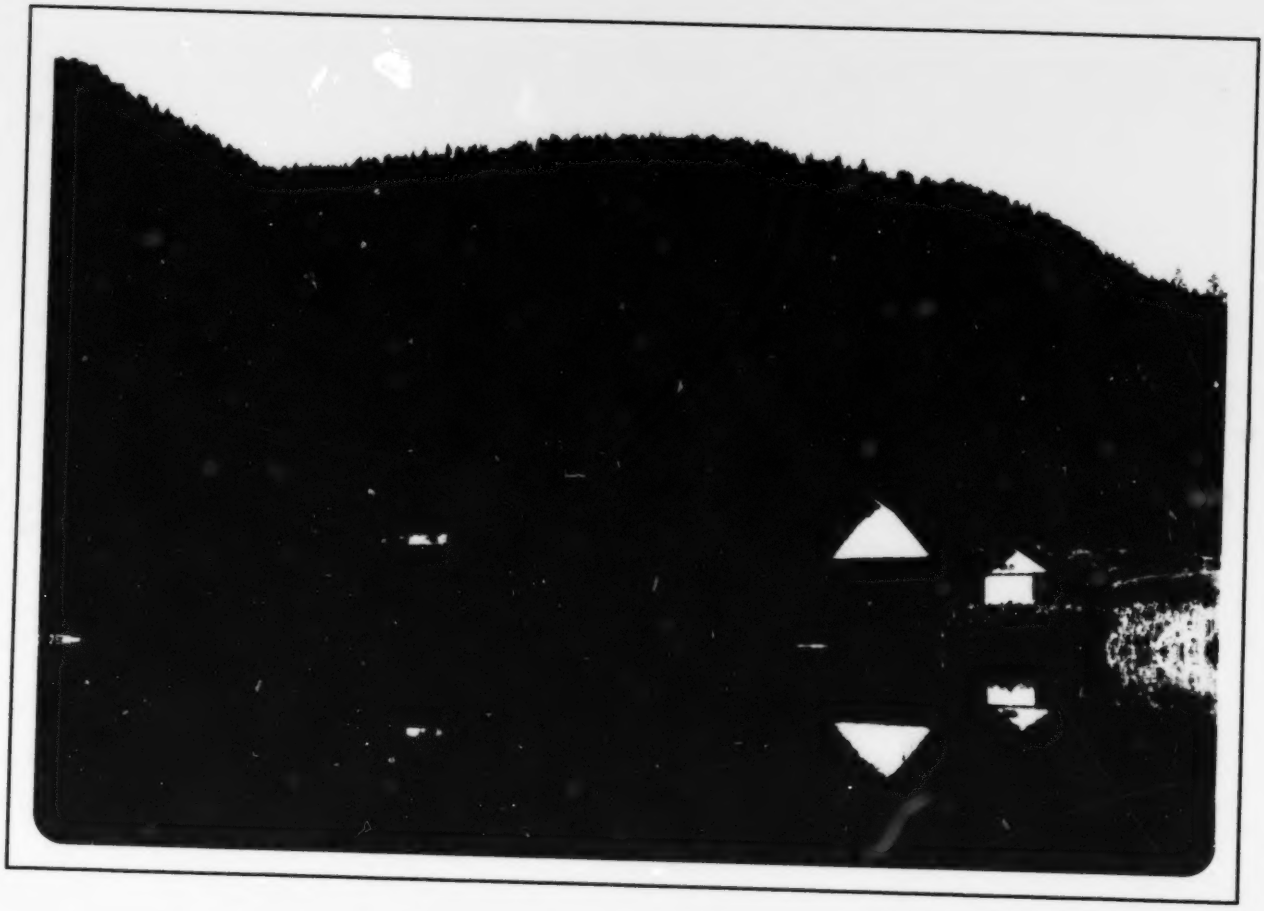
Kamloops
Range Research Station
1928-1985



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Kamloops
Range Research Station
1928-1985

Alastair McLean

Research Branch
Agriculture Canada

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photograph on the title page
Headquarters of the Kamloops Range Research Station, 1973.

cover photo
General view of Pass Lake Substation, 1949.

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Introduction

L.B. Thompson (*left*) and Sidney E. Clarke (*right*)

British Columbia was the first province in Canada to develop a range cattle industry. The first settlers were well educated and adapted their customs to their new way of life and to their community. They took a marked interest in politics and were well represented in the British Columbia legislature as early as the latter part of the 19th century.

In the first half of the 19th century, grazing of rangeland by domestic stock in the interior of British Columbia was started to provide a feed source for the horses of the large pack trains of the fur brigades. These brigades moved furs and supplies between the gathering points in the interior and the coastal shipping points. Beef cattle became important in the interior between 1858 and 1865, when large numbers of cattle were driven into the province to supply the Cariboo gold rush. About 22 000 head of cattle were driven across the United States border at Osoyoos, B.C., between 1859 and 1870.

The first ranchers settled in the southern interior in the early 1860s, and by 1887 ranches had been established on all the best ranges in the southern interior. Grazing in the early days was confined almost entirely to the grasslands. Overgrazing of these lands was recognized by the turn of the century, by which time fencing of the ranges was well under way. Fencing was accelerated by the rapid increase in homesteading from 1880 to 1915. Overgrazing was inevitable but was reduced temporarily by heavy livestock losses from a number of severe winters, especially in 1879 and 1897. These losses led to the practice of putting up hay for winter feed. This operation was a major factor in stabilizing the ranching industry in the province. Forested ranges were not used to any great extent until the 1920s.

Most of the rangelands are now controlled by the provincial government, except for some grasslands that are usually close to ranch headquarters and that are owned privately. Before 1919 the administration of rangelands was haphazard. In 1919 the provincial *Cattle Ranges Act* was passed and a commissioner of grazing was appointed.

Concern over the depleted condition of the rangeland led to an inquiry conducted by the chief forester in 1930. Changes in the administration of the rangelands were recommended, and the need for research on range problems was recognized. As a result, in the summer of 1931, L.B. Thomson and S.E. Clarke of the Dominion Range Experiment Station at Manyberries, Alta., carried out a survey of range conditions in the province at the request of the British Columbia Forest Service and the federal Department of Agriculture. Accompanying them on this survey were Wallace Gunn, provincial livestock commissioner; B. Brown, assistant grazing commissioner; George Challenger, district agriculturist for the Kamloops area; and Gabriel Luyat, district agriculturist for Williams Lake. That fall Mr. Thomson made further observations, and R.H. Carlyle, livestock assistant at Manyberries, conducted a survey of winter conditions.

Upon the formation of the national advisory committee on agricultural services, the forage committee for British Columbia investigated the range problem further. In 1933 T.P. MacKenzie, grazing commissioner, carried out an intensive survey to determine the suitability of certain areas for experimental work. The ranges controlled by the Tranquille Sanatorium were found to be well suited for this purpose. Accordingly, in 1935 an agreement between the Dominion Department of Agriculture and the provincial government was signed establishing an experimental station, with headquarters in Kamloops. As part of the agreement, the Tuberculosis Sanatorium beef herd was to be used for experimental work.

A substation of the Dominion Range Experiment Station, Manyberries, Alta., was established in 1935, and a research program was initiated under the supervision of Sidney E. Clarke. T.P. MacKenzie was officer in charge for the first 2 years, after which Edwin W. Tisdale took over. The disbanding of the provincial beef herd and wartime economy measures by the federal government resulted in the closing of the substation in 1940, with Dr. Tisdale moving to the experimental station at Swift Current, Sask. He obtained permission to use the summer and fall of 1940 to collect and write up as much research material as possible before moving to Swift Current in the spring of 1941. Dr. Tisdale continued to keep periodic records of the key research areas until 1947, thus ensuring their continuity.

Group of experimental farm scientists at planning meeting for the Kamloops station. 1947.

Research activities for the cattle industry were reestablished in 1947, when the Dominion Range Experimental Station was opened at Kamloops at the present location, with headquarters about 13 km northwest of town. During 1946 and 1947 Dr. Clarke handled the acquisition of land for the headquarters. He negotiated agreements for the purchase of key Crown provincial grasslands and the British Columbia Forest Service Tranquille provincial forest.

The research program was started in 1947 and was conducted under the direction of T.G. Willis, superintendent and field husbandry specialist. The station's other pioneer scientists were M. Alan MacDonald in animal science and Alastair McLean in plant science. Dr. McLean retired in 1986 after 40 years with the Research Branch. By 1958 the specialties of agronomy and soils were added when W.L. Pringle (1952), W.A. Hubbard (1955), and A.L. van Ryswyk (1958) came on staff.

There have been several name changes for the station since it was established in 1947. In the mid 1950s the word Dominion was dropped from the name and replaced by Range Experiment Station. With the amalgamation of the experimental farms and science services in 1959, all establishments became known as research stations and the superintendents were then called directors.

Tom Willis was in charge of the station until 1961. Richard H. Handford took over in 1962, after amalgamation with the Entomology Laboratory, and he directed the establishment until 1970. James E. Miltimore was director from 1970 to 1973, followed by Donald E. Waldern, who was succeeded in 1978 by Kenneth Dawley.

Mr. Dawley had been transferred from the substation at Prince George and was on the job for only 7 weeks when he died suddenly. Alastair McLean was acting director from 1978 until 1980, when James D. McElgunn became director. The number of scientists on staff at Kamloops has ranged from three to six over the years. In 1979 the administration of the experimental farm at Prince George was transferred to Kamloops from the Beaverlodge Research Station, Alta. It was initially staffed in 1978 by W.L. Pringle, as superintendent and agronomist, and in 1979 by Klaas Broersma, who worked in soil fertility. In 1982 Lyle Rode joined the staff to work in animal science.

The present staff of the Kamloops Range Research Station consists of six scientists covering the specialties of range cattle husbandry; range management and improvement; range ecology; dryland and irrigated forage crops for hay and pasture; range and crop soil fertility; plant biochemistry; plant physiology; and integrated use of resources including livestock, forestry, and wildlife. The station at Kamloops is the only one in the Research Branch devoted exclusively to range management and to studies on the integrated use of natural resources in rangelands.

Thomas G. Willis

Alastair McLean

James E. Miltimore

Donald E. Waldern

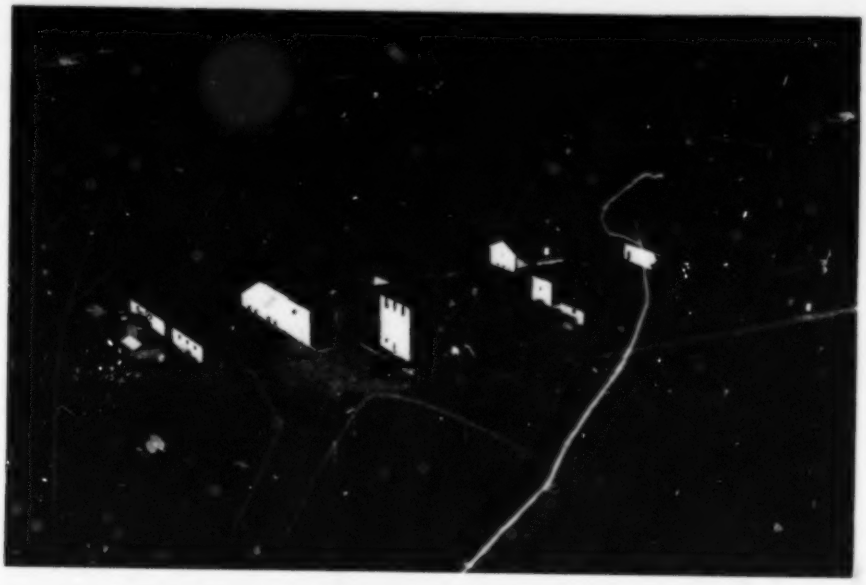
Kenneth Dawley

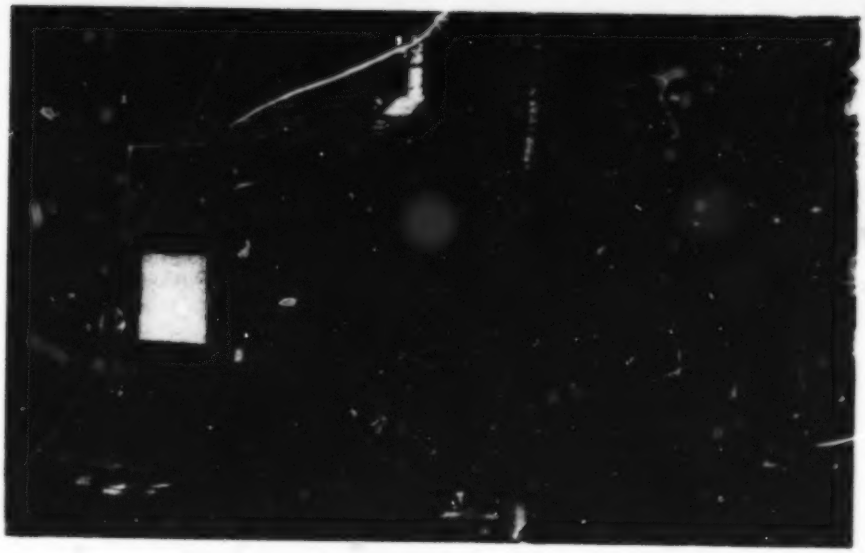
James D. McElgunn

J. Alden Robertson

CHAPTER 1
Entomological Research, 1928–1971

Livestock Insects Laboratory





above
Aerial view, Entomology Laboratory, Mission Flats, Kamloops, 1960.

below
Eric Hearle

Entomological research started at Kamloops in 1928 when the Livestock Insects Laboratory (later known as the Veterinary and Medical Insects Laboratory) of the Department of Agriculture was established by Eric Hearle. Kamloops was selected because of its ecological diversity and thriving range cattle industry. The office was located in the post office building on Third Avenue and Seymour Street in Kamloops. A laboratory and insectary was located near the southwest corner of First Avenue and Victoria Street in a former undertaker's parlor, which was destroyed by fire in 1934. Land was purchased on Mission Flats, and the staff used some old buildings on the site, including the Cunliffe-Bowles log house. The post office building provided office space in town until the laboratory–office building on the Mission Flats site was completed in 1938.

The initial research program included studies on biting flies, cattle grubs, cattle lice, and ticks. By the time of his death in 1934, Eric Hearle had organized a broad program of projects on the control of biting flies. He had also introduced derris into Canada for cattle grub control, with

organized control programs for the area, and had made a start in the study of tick distribution and tick paralysis.

From 1934 until 1936 the laboratory continued under the supervision of George Spencer, with service throughout the summers by John Gregson and with Ted Moilliet carrying out the basic program. Mr. Gregson started full-time service in May 1936 and was joined by George Holland in December 1936. G. Allan Mail was officer in charge from 1937 to 1943 and supervised the construction of the new laboratory. John Gregson was in charge from 1944 to 1954, at which time the unit was joined with the Field Crops Insects Laboratory.

In 1937 the Department of Agriculture was regrouped to form the Experimental Farms Service and the Science Service. The Livestock Insects Laboratory became part of the Science Service.

The natural affinity between veterinary entomologists and researchers conducting public health studies on diseases communicable to humans led to cooperative work between George Holland and John Gregson. The achievements of the laboratory were numerous and varied. During their period of association (1936–1948) Mr. Gregson and Mr. Holland carried out extensive studies on fleas, ticks, and cattle grubs. They developed the first known method of collecting and raising large numbers of pupae and flies and produced the first studies on the behavior of cattle grubs, based on adequate numbers of insects. The first survey and control programs for biting flies at Jasper, Banff, Winnipeg, and Kitimat were conducted by the unit.

Studies of tick morphology and tick paralysis gained widespread international recognition. With the introduction of veterinary systemic insecticides, the tests of these compounds conducted by the unit were widely recognized. John Gregson became an internationally acclaimed acarologist, and George Holland became an internationally recognized authority on fleas, as a result of studies started while he was at Kamloops.

Many moved on from service at Mission Flats to academic positions, including Ian McTaggart Cowan, who was later appointed dean of graduate studies at the University of British Columbia and chancellor of the University of Victoria, and Kenneth Bournes and the late Morley Neal, professors of zoology at universities in eastern Canada.

A period of staff expansion occurred after World War II, reaching a peak in 1952, with seven entomologists and support staff. The longest period of service with the unit was by John Gregson (35 years).

top left
G. Allen Mail

top right
John D. Gregson

bottom
Staff of Entomology Laboratory, Department of Pensions and National Health, and Range Substation, Mission Flats, 1939

above
E. Ronald Buckell (*left*), and George J. Spencer (*right*)

above right
Entomology Laboratory field station near Lac du Bois, 1938. This was formerly the Lac du Bois school.

Field Crops Insects Laboratory

The Field Crops Insects Laboratory was moved from Vernon to Kamloops in 1939. This unit had been located in Vernon for 22 years after having opened in 1917 with staff from the Entomology Laboratory at the Agassiz Experimental Farm. Ronald Buckell was in charge at Vernon from 1922 and continued at Kamloops until his retirement in 1949, when Richard Handford took over. The staff occupied space in the post office building until 1955, when the unit was amalgamated with the unit at Mission Flats. Research was conducted in the areas of field crops, vegetables, and rangeland insects with emphasis on grasshopper control research. Studies on insects of field crops included tuber flea beetles, cutworms, root maggots, and carrot seed-crop pests.

Laboratory of Hygiene, Department of Pensions and National Health

Although the Laboratory of Hygiene was not part of the Department of Agriculture, it was affiliated with the Veterinary and Medical Insects Laboratory because of the overlap of diseases communicable to both animals and humans. The two establishments shared the same office building but had separate laboratories.

The main areas of study of the Laboratory of Hygiene were Rocky Mountain spotted fever, tularemia, and plague surveys. In 1954 all records were transferred to Ottawa, and the building was subsequently occupied by the Veterinary and Medical Insects Laboratory.

Personnel in the plague surveys were R.J. Gibbons, Dorothy Halmer, and Frank Humphreys. Serving in field collections were Jack Poole, Gordon Dowding, and Eric Smith. Mr. Smith also worked in the laboratory along with Margaret W. Driver and Gwladys N. Hatton. Alex G. Campbell was a bacteriologist assisting Dr. Humphreys.

Mr. Campbell recalls boating to work during the 1948 flood. The boat was tied to the front door of the main building, and the animal building was so filled with water that only the top two tiers of a five-tier cage could be used for guinea pigs. Hip waders were a necessity.

Once the areas where plague was known to occur had been mapped, the need for the laboratory ceased to exist and the unit was moved to Ottawa in 1958.

Entomology Laboratory

The Entomology Laboratory was established in 1955, with the amalgamation of the Field Crops Insects and Veterinary and Medical Insects laboratories. Richard Handford was placed in charge of this new unit of the Science Service. The Entomology Laboratory was located on 13 ha of

Entomology administration building during flood of Thompson River in 1948 (George Holland in sailboat).

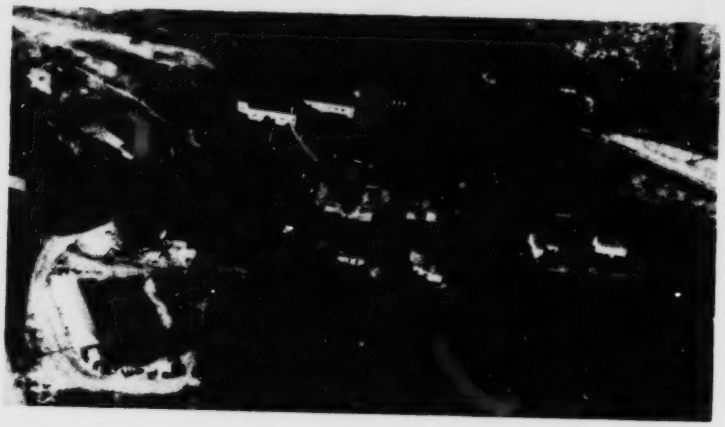
Richard H. Handford

land, 5 km west of Kamloops on the south bank of the Thompson River. It consisted of two large and two small laboratory buildings, a greenhouse, two residences, a barn, and several storage sheds and insectaries. A new office-laboratory building of modern design was completed in 1957, and a greenhouse with an automatic temperature control was attached to it in 1958. In 1959 the Science Service and the Experimental Farms Service were amalgamated to form the Resarch Branch. However, the Entomology Laboratory and the experiment station continued to operate from their own physical plants on Mission Flats and Brocklehurst.

The work of the laboratory was primarily concerned with insects and ticks affecting livestock and with insects affecting range vegetation. Some of the earlier work on warble flies, ticks, and field crops insects had been taken over by the research stations at Lethbridge, Vancouver, and Summerland (1965). Research was maintained on the ecology, physiology, and control of several species of ticks, cattle grubs, mosquitoes, and black flies. These programs were gradually phased out, and the Entomology Laboratory was closed in 1971. The Mission Flats site was declared surplus and was sold to the city of Kamloops, which in turn sold it to the Weyerhaueser pulp mill.

Staff of Entomology Laboratory, 1957.

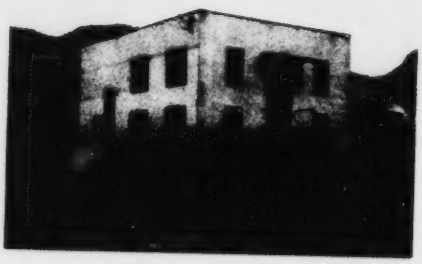
CHAPTER 2
Rangeland Research, 1935–1985



top
Aerial view of research station headquarters, 1955, showing dugout for the water system (*lower left*), and PFRA house.

center
General view of Pass Lake Substation, 1949.

right
Administration building, 1948.



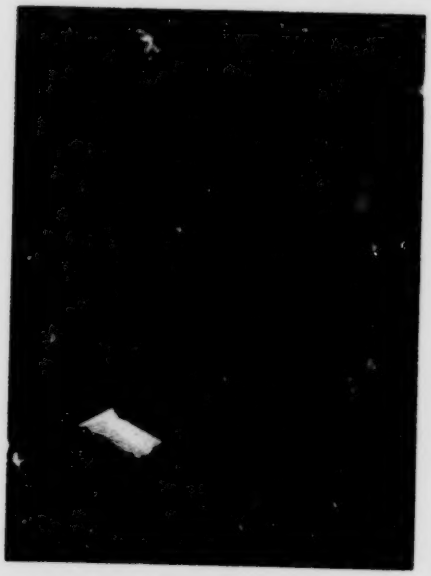
Dominion Range Experimental Substation

Following negotiations and surveys, an agreement was reached between the Dominion Experimental Farms Branch and the Department of the Provincial Secretary whereby the Tranquille Sanatorium cattle herd and the Tranquille range were to be used for research and demonstration. The Department of Lands allowed the Department of the Provincial Secretary free use of the adjacent grazing leases and timber range. Until 1931 this range came under the jurisdiction of the Dominion Government, as it was within the railway belt. Also, the Forest Branch of the Department of Lands, which had control of the administration of all Crown provincial range, established the Tranquille Forest Reserve on which the Tranquille cattle herd was permitted to graze.

The program of the substation was initiated in 1935 under the direction of S.E. Clarke of the Dominion Range Experiment Station, Manyberries, Alta., which was part of the Experimental Farms Service. T.P. MacKenzie, former grazing commissioner for British Columbia, was the officer in charge for the first 2 years. E.W. Tisdale then took over and conducted the research on range management, ecology, and forage crops. T.P. MacKenzie was in charge of the animal husbandry section.

For the first 3 years the office was housed in the Kamloops post office building. In 1938, suitable office accommodation for headquarters and the use of about 12 ha of farmland were obtained in the newly built Entomological Laboratory at Mission Flats. A field station cabin was built close to the east end of the Dewdrop Flats at Tranquille. A forest range field station was established on the Pass Lake property, about 29 km north of Kamloops (610 m elevation), using the cabin and barn that had been built by the Dominion Forest Service in 1913 to service the fire lookout on Porcupine Ridge and the telephone line to it. A garage (later converted to a bunkhouse) and workshop were built in 1936 and an icehouse (later a woodshed) in 1948. There was also a ranger's cabin close to the east end of Tranquille Lake. The telephone line ran 40 km from Halston, past the cabins to the lookout. The Department of Agriculture had acquired title to 470 ha around Pass Lake from the Dominion Forest Service.

Dr. Tisdale and Mr. MacKenzie undertook studies in the identification and characteristics of range plant species, range condition, classification of plant commu-



left
Edwin W. Tisdale

right
T.P. MacKenzie

below
Main cabin at Pass Lake, 1935, built by Dominion Forest Service in 1912.

nities, plant succession, soil-plant relationships, range carrying capacities, and range management and improvement. Plant nurseries, forage variety trials, and range seeding experiments were undertaken. Studies on animal husbandry emphasized range management and response of cattle to various grazing practices. Through adjustments in range management, the herd of well-bred Herefords was increased from 475 head in 1935 to 750 head by 1940. The grassland ranges were rested during the summer and better use was made of the forested range. Field husbandry included range water development and fencing practices. These two men undertook an amazingly broad forage, range, and livestock program. There were few areas that were not touched on in the 5 years during which the substation was in operation. No previous investigations had been made of British Columbia ranges, and although some of the results from studies in the western United States were helpful, there was a great deal of basic work to do before some of the applied projects could be undertaken properly. One of the pioneer studies was on the soil–vegetation relationship on the Tranquille range done by Dr. Tisdale and Dick Spilsbury of the British Columbia Soils Survey staff.

Mr. Spilsbury later became chief of the Research Division of the British Columbia Forest Service. However, many of the major studies were no more than well started by 1940 when the station was closed and Dr. Tisdale moved to the Swift Current Research Station. Later he moved to the University of Idaho at Moscow, Idaho. As professor of range management he maintained the interest in the ranges of northwestern North America first formed in British Columbia, published several papers on British Columbia and related rangelands, and taught an accelerated range extension course for the University of British Columbia at Kamloops in 1975.

Access to the experimental ranges and the ranching country in general was difficult, and travel consumed much time. However, many of the results from this initial period are still used as benchmarks in our current research program. Most of the information obtained was basic. Its chief value lay in the light it shed on the rangelands rather than in practical applications for immediate use and thus proved to be invaluable as a basis for future range research. Between 1941 and 1947 Dr. Tisdale and students employed by the Swift Current Research Station made summer trips to Kamloops and continued many of the studies.

top left
Branding at Hudson's Bay meadow corrals, 1936.

top right
Cutting at Lake du Bois corrals, 1937.

bottom left
Headquarters shop and bunkhouse under construction, 1948.

bottom right
Headquarters shop, completed in 1948.

Student assistants from 1935 to 1940 included V.C. Brink, later professor of plant science at the University of British Columbia; D.K. Taylor, who later had a notable professional career on the Agassiz Experimental Farm staff; and Donald Elliott, who became a schoolteacher, and is now retired in Vancouver.

Other key staff members during this period were William Godlonton, Jimmy Brown, and William Huxley. William Godlonton, chief range rider for the Tranquille Sanatorium, was responsible for the actual handling of the herd and was extremely helpful in carrying out various grazing trials and management practices. Mr. Godlonton was an experienced rancher and a fine observer and raconteur who did much to add flavor to camp life at Pass Lake, where the staff spent most of their time during the summer grazing season. Jimmy Brown was leader of the range construction and fencing crews. William Huxley, later on the staff of the Entomology Laboratory, served with the substation from 1938 to 1940 on the forage crop program at the Mission Flats site.

Dominion Range Experimental Station

Forage crops and rangeland research was reestablished at Kamloops in 1947 by S.E. Clarke, with the opening of an experimental station. Fifty-six hectares north of the airport were acquired for the headquarters. The land was transferred from the Department of Transport, which had held it as part of the airport acquisition. Part of the area was abandoned orchard land that had once been irrigated by the British Columbia Fruitlands irrigation system. Evidently the site had been used at one time by Indians as a campsite, because some artifacts were uncovered during construction of the

superintendent's residence. The departmental land (470 ha), corrals, and buildings at Pass Lake were renovated and used.

In addition, control of grazing on 1942 ha of grassland and forest land was obtained through orders-in-council from the provincial government. By agreement with the British Columbia Forest Service and the Tranquille Livestock Association, the station obtained control and use of grazing within the Tranquille Forest Reserve. The station controlled the association cattle in exchange for research data.

About 32 ha of the headquarters property were set aside for irrigated plots to study hay and pasture production. The office–laboratory was built in 1947 by two carpenters from the Swift Current station. The first two cottages, shop, and warehouse were built in 1948 as well as the oil house and first pumphouse. A walk-in refrigerator was purchased from a construction company on completion of the oil refinery, and later, growth chambers were installed in the area.

The cookhouse and bunkhouse were built in 1949, the barn in 1950, and the superintendent's residence in 1951. In 1961 the cookhouse and bunkhouse were converted to a residence and small-animal laboratory, respectively. A few years later the cookhouse was used as an overflow library and storage area, and the bunkhouse was turned into a lunchroom, a place for grinding forage and soil samples, and a storage area.

In 1954 the storage shed for fertilizer, herbicide, seed, and equipment was moved from the barn to its present location. An addition was built on the west end of the administration building for farm offices, including a new director's office constructed in 1955. In 1971 the library and reception area were extended, and the location of the main entrance was changed.

Most of the material for the original buildings came from three war surplus army "H" huts from the Vernon camp. The huts were torn down, and the materials were transported to Kamloops. Many of the old window frames and doors still make up part of the buildings. The administration building was originally heated by hot air from a large coal furnace that was in one of the army huts, but the furnace was converted to oil in 1956 and replaced with a hot water system in 1972. Conversion to natural gas took place in 1984.

The eight rooms in the bunkhouse were filled immediately. Mamie McCord was employed as cook and was succeeded a few years later by her sister-in-law, Opal Meldrum.

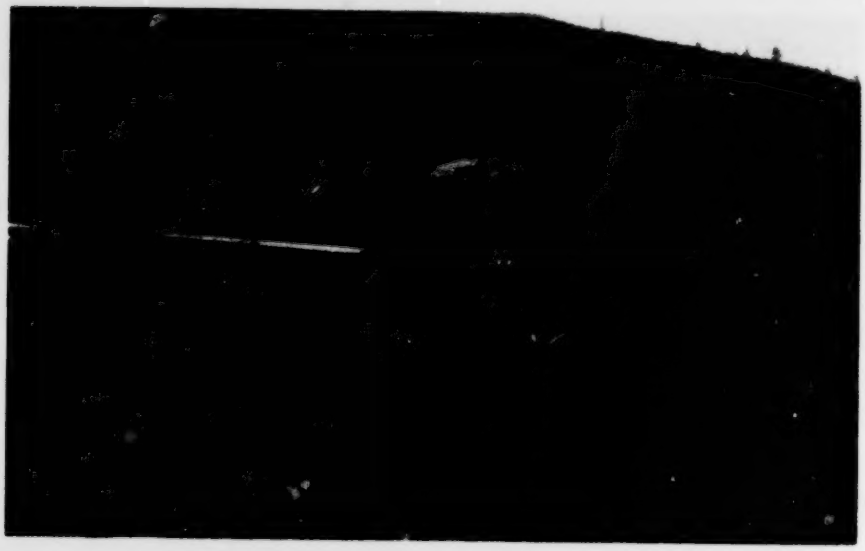
Construction of dugout for first water system at headquarters in 1948. (F. McCallum, PFRA engineer in charge, at pumps.)

Len Cooper was the crew leader in charge of the demolition and construction. Alfred Davoren and Bernard Nelson were employed during this phase as well. As the road to town improved and the cost of running the bunkhouse and boarding increased, these enterprises were dropped and the buildings were turned into work areas. Orville Selbee, George Davidson, Bernard Nelson, and Henry Handschuh joined the construction crew in 1948. Mr. Nelson left when construction was completed but returned for steady employment in 1954. Mr. Handschuh was a trained landscape gardener and did an excellent job of landscaping the grounds and maintaining them for 25 years. Indeed, he left a lasting mark on the city because he landscaped the grounds of the Kamloops Golf Club as well as those of residential properties.

Since the location of the Kamloops Range Experimental Station was new, except for the Pass Lake holdings, most of the activities during the first 3 years were devoted to construction of plant facilities for research, housing, farming, and range management. Consequently, only limited organized research was undertaken before 1950.

A serious flood occurred in the spring of 1948. All the fields were under water almost up to the base of the pumphouse. Although the railway tracks were above the flood level, water entered the property through culverts underneath the tracks to the west of the property. To prevent the recurrence of flooding, a dike was constructed close to the west end of the property in 1950. Heavy spring runoff in March 1957 from adjacent hillsides prompted the building of an interception ditch and dike along part of the north side of the property.

Obtaining water for domestic and farm use was a difficulty. After many unsuccessful sandpoints were driven, a large dugout was excavated south of the pumphouse, and water, which was very saline, was drawn from there for domestic use. This water supply was supplemented during the summer by the addition to the dugout of the British Columbia Fruitland irrigation district water. Potable water sometimes had to be hauled from town. Also, the water requirements of the laboratory increased dramatically over the years as it expanded and as more people were hired, with the result that the original water system



top left
The first irrigation system at headquarters consisted of a ditch and a portable pump, 1950.

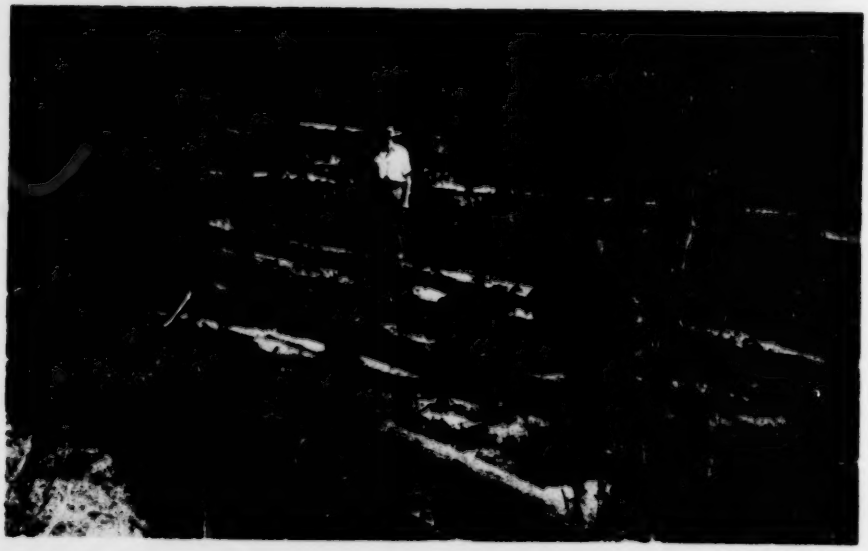
top right
First experimental range seeding under way on Riske Creek prairie, November 1948.

right
First station rangeland seeder in action on sagebrush range, 1955.

below
Alan MacDonald in beetle-killed lodgepole pine in Watching Creek basin, 1947.

opposite page left
Experimental burn of lodgepole pine in Watching Creek basin, 1949.

opposite page right
Bill Pringle in a stand of grasses aerially seeded in 1963, following a forest fire near Lac le Jeune.



became inadequate. (The electrical system suffered the same fate and had to be upgraded twice, largely because of the addition of more sophisticated and energy-demanding laboratory equipment.) Irrigation water was obtained from the British Columbia Fruitlands irrigation district, but only from late May to October. In 1952 a pumping system from the river was completed, which provided a more reliable and ample water supply. For a number of years the Kamloops Golf Club received water from this line. In 1983 because of increasing concern over breaks in the old wood-stave pipe from the river, the system was replaced and pumps were upgraded. (In 1952 F. McCallum, Prairie Farm Rehabilitation Administration (PFRA) engineer, had estimated a 30-year life for this pipeline.)

Riverbank erosion in the vicinity of the pumphouse has remained a problem over the years. In the mid 1950s it was especially serious when the river channel moved close to the north bank. In March 1956 H.L. Topham, PFRA engineer, determined that from January 1933 to September 1951 the bank eroded at an average of about 1.2 m per year, but that between September 1951 and March 1956 this average rate increased to about twice that rate.

A general goal for the station's research program evolved in its first 3 years of operation: "Investigations in range management relating to rangelands contiguous to the interior valleys of British Columbia and the Cariboo Plateau and investigation of methods of increasing the efficiency of range livestock production consistent with range conservation and revegetation." From this goal an expanded program of research into problems of range livestock was undertaken, centered around range livestock husbandry, cultivated forage crops, range ecology, and soils. Research was conducted in the following areas:

(1) Forage crop trials on irrigated and dry land.

(2) Herbage investigations under various methods of grazing on grassland and forest ranges.

(3) Study of various methods of range management.

(4) Study of irrigated pastures on arable lands and how these pastures fit into the ranch system.

(5) Study of various production problems relating to ranching in British Columbia.

(6) Study of plants poisonous to livestock and methods of controlling poisoning.

(7) Study of the heritability of feed efficiency of beef cattle.

(8) Study of irrigation problems as related to hay production.

Although much of the research of the Kamloops station necessarily has been long-term, the emphasis has shifted over the decades. During the first few years, a wide variety of projects were undertaken to obtain some guidelines for ranchers in their range and cattle management. The first 5 years of studies that Dr. Tisdale had initiated in the 1930s were reviewed, and the range plots he set out were located and recharted. Various irrigation systems were evaluated, and about 33 ha were under irrigation by 1952. Plant-introduction nurseries and variety and species tests on both irrigated and dryland were established. These were of a broad nature initially, but by 1954 emphasis was being placed on alfalfa and by 1965, on silage and grain corn.

Range seeding trials were undertaken on both grassland and forest range, with stress on the latter. Seeding trials on sedge meadows were emphasized from about 1961 to 1967.

A number of controlled burns were attempted, starting in 1949, on forested range in the Watching Creek basin, which contained much beetle-killed and fallen lodgepole pine and dense regeneration of pines. On the 1949 Watching Creek fire project, a 115-ha area was selected and fireguards were constructed. Under appropriate weather conditions, a British Columbia Forest Service suppression crew ignited about 1 km of backfire. The wind changed direction shortly after, and the fire jumped the guard and burned about 16 ha in one of the control areas, which immediately became a treatment location since there was no suitable burning weather during the rest of the fall.

Following wild fires in the Kamloops forest district, aerial seeding was tried using a variety of machines and aircraft. The forest fires near Lac le Jeune in 1959 and 1960 were studied intensively. Plant successions were noted, and forage variety trials were set out to determine the best species to seed. Studies of aerial seeding on the 1951 fire represented the first attempts at aerial seeding of grass on burned-over forest range in British Columbia. Beaver aircraft proved to be well suited to aerial seeding.

Preliminary experiments were undertaken starting in 1950 for the control of big sagebrush using both herbicidal and cultural methods, including the use of aircraft. The herbicide 2,4-D proved effective for the control of big sagebrush. This weed is also very susceptible to burning, provided there is enough old grass present to sustain a fire. Later studies were also carried out on cinquefoil and diffuse and spotted knapweed.

In the 1950s considerable emphasis was placed on obtaining data on composition, productivity, and condition of range vegetation types, especially in the grasslands of the southern interior. Impetus and financial support were given to this project starting in 1950 for 3 years of study by members of the Assessment Branch of the British Columbia Department of Finance, who wanted the Kamloops Research Station to supply them with an equitable method of assessing grassland range. This study continued for about 10 years. The information obtained proved later to be invaluable in evaluating range condition for management purposes.

Timber milkvetch poisoning and ponderosa pine abortion had been identified as possibly serious problems, and studies were started in 1949 to find a cure, either by clinical means or management practices. For ponderosa pine, poisonings were induced and management recommendations made by 1954. A number of experimental poisonings were conducted with cows grazing timber milkvetch. Although the poisoning agent was not determined, injections of thiamin were found to be effective in treating poisoned cows. Cooperative studies with the Irving Clinic in Kamloops showed that the heartbeat of poisoned sheep was similar to that of humans suffering from beri-beri. This study was discontinued in 1961, when Hugh Nicholson moved to the University of Saskatchewan.

Studies on poisonous plants were reactivated 10 years later, however, when Walter Majak, a biochemist, joined the staff. The poisonous principle in timber milkvetch was determined to be a compound containing nitrogen, and field surveys were conducted to reveal potential hazards. Research was also started on pasture bloat in cooperation with the research stations at Saskatoon and Lethbridge. These studies are continuing, with special emphasis on the detoxification capability of rumen microbes. Alkaloids in reed canarygrass were studied, and wet meadows in British Columbia appear to yield levels safe for animal consumption.

The cyanide potential of saskatoon serviceberry was investigated. Twigs and new growth of saskatoon serviceberry can be lethal to cattle.

In 1950, Tom Willis initiated studies on the use of irrigated pastures in a ranching program, especially for the grazing of slaughter animals. Productivity was determined first, followed from time to time by rotations, pasture mixtures, zero-grazing comparisons, and combinations of winter feeding and summer weight gains until the late 1960s.

Ed Tisdale and Dick Spilsbury had documented soil–plant relationships in the Kamloops area as early as 1937. In 1954 a request was received from the British Columbia Soil Survey for assistance in describing native vegetation in the regions that were being surveyed and mapped. This activity occupied much time over the next decade, when it was determined that there was a good correlation between plant communities and soil classification in the surveyed regions. Research was conducted in cooperation with soil surveyors in the southern Rocky Mountain Trench, Kettle Valley, and Similkameen Valley. For each major soil type in these surveyed regions, the plant communities were identified and described, plant succession was determined where possible, and forage productivity was measured. Soil–plant community relationships on grasslands near Kamloops were also studied.

Studies on carrying capacity of rangelands were started in 1956 and continued for 7 years on a sedge meadow near Saul Lake in the Tranquille provincial forest. The carrying capacity of pinegrass range was started in 1960 near Pass Lake and continued for 7 years. When ranchers from the Cariboo-Chilcotin region reported that pinegrass was poisonous to cattle, the experiment was repeated near Williams Lake for 3 years. Similar gains to those reported in the Kamloops trial were obtained. Studies on various phases of carrying capacity are still being carried on. In the early 1970s some trials were conducted to determine the carrying capacity of seeded grassland range.

Studies on range fertility and use of fertilizers were started in 1959 and have been carried on from time to time since then. In the earlier years emphasis was placed on the grasslands and sedge meadows and latterly, on clearcut forest range.

Studies on the ecology of some native forage species have been undertaken periodically. The germination requirements and root-system characteristics of forest species were studied in relation to the range-burning experiments in the 1950s. The ecology of big sagebrush was emphasized in the early 1960s. The characteristics and reaction to grazing of pinegrass, bluebunch wheatgrass, and rough fescue were first studied in the late 1960s and have been examined more intensively since 1977.

As a result of expanded interest in lawn turf on the part of homeowners and golf course superintendents, a series of turf trials were conducted during the late 1950s and the 1960s. This project evolved into a cooperative one with the Agassiz Research Station, when responsibility for this work was moved there from the Saanichton Research Station.

Detailed studies on the classification and genesis of alpine soils of the southern interior were started in 1964 and continued for about 5 years. The classification and productivity of sedge meadows were undertaken in 1972, and they have been studied intermittently since then. Biological control of spotted and diffuse knapweed was started in 1970 with the release of a gall fly, in cooperation with the Agriculture Canada research institute at Belleville, Ont. Other phases of the study on knapweeds have been conducted since that time. Recently, possible allelopathic properties of knapweed (where exudates from the knapweed inhibit germination and growth of other plant species) have been studied.

At the request and with the cooperation of the British Columbia Fish and Wildlife Branch, research on the degree of conflict between deer and cattle on winter ranges was initiated in 1971 and continued for 7 years. Competition for feed was found to be most severe in early spring. In recent years, the studies have been centered on the summer cattle range.

In 1971 research was started at the request of the chief forester, British Columbia Forest Service, on the study of the degree and nature of competition between seeded grasses and tree regeneration (lodgepole pine and spruce) on clear-cut-logged areas. A series of projects were done in cooperation with the Research Branch of the British Columbia Forest Service. We had successfully conducted studies in the 1960s on seeding of grass on burned-over areas, which we applied to the 1971 study.

top left
Spraying 2,4-D on sagebrush range, Perry Ranch, 1962.

top right
Cattle on experimental irrigated pastures, headquarters 1953.

center left
Experimental bunker and snow fence silos at headquarters, 1953.

center right
Experimental sedge meadow near Saul Lake, Kamloops. Hugh Nicholson weighing cattle, 1956.

left
Alastair McLean weighing cattle at Community Lake grazing experiment on a clearcut-logged site, 1977.

above
Experiments to determine possible conflict between mule deer and cattle were conducted on winter range from 1971 to 1978.

below
Rangeland seeder designed and built by engineers of the research station and the British Columbia Ministry of Agriculture, 1979.

A study of the diets, nutrition, and production of cattle that graze on seeded clear-cut areas and native forested ranges was begun in 1976, when Dee Quinton joined the staff. With the coordinated plans for range use started in the area in 1977 and the completion of fencing of the Lac du Bois grasslands in 1979, this project was expanded to include the three grassland zones. In conjunction with research on cattle, range trend, forage utilization, and range production are being monitored under seasonal, continuous, and rotation-grazing management practices.

A series of feeding trials with cattle were undertaken in the late 1970s on the feeding of wood waste to cattle and on winter feeding levels in relation to weight gains the following summer.

In 1977 a major project was undertaken in cooperation with the Engineering Branch, British Columbia Ministry of Agriculture, to build a range disc-seeder packer that would stand up to the demanding conditions of our grassland ranges. This machine was built successfully, tested for a number of years, and two are now in use on our ranges.

In 1977 a new project was undertaken to study plant frosthardiness and winter survival. Proper fall management for winter survival of alfalfa was emphasized. However, basic studies to determine how freezing causes injury to plants were also conducted. In 1982, when Darryl Stout was on a work transfer at Cornell University, he and his colleagues developed a new theory of freezing injury. They discovered that large electrical voltages can develop when water freezes and that these voltages can cause plant injury.

Under a recent project, methods of high-tension and high-tensile (smoothwire) fencing have been tested, the latter in cooperation with the Agricultural Engineering Department, University of British Columbia. A keen interest in the recommended fencing techniques has been shown across Canada, with producers readily accepting this new technology.

With the cooperation of the Soil Test Laboratory, British Columbia Ministry of Agriculture and Food, field trials were begun in 1974 and are being continued. These field trials are intended to determine the correlation of soil test values and the field response of irrigated silage corn and reed canarygrass to applied fertilizer nutrients on wetlands. Contract research was carried out to develop techniques for identifying and mapping range plant communities from aerial photos and assessing their condition and trend. An interim manual on grassland plant communities has been completed.

A new project was started in 1984 to monitor understory herbage production from three levels of thinning Douglas fir. With increased financial restraints during the past few years, the introduction of new projects has been curtailed.

Pack train at Pass Lake with supplies for British Columbia Forest Service lookout on Porcupine Ridge, 1948.

Pass Lake Substation

Until 1931 the Dominion Forest Service was responsible for the administration of the forested lands around Pass Lake, about 20 km north of Kamloops. The Forest Service built a chain of cabins and lookouts from Pass Lake north and west toward Criss Creek. Sydney Bruce, the first Pass Lake forest ranger, built a cabin on the west shore of Pass Lake in 1912. Alan Parlow, later district forester at Kamloops, worked on this cabin as a University of British Columbia student in forestry. Gradually the operation expanded as more cabins were constructed and a telephone line was established linking the far cabins and Porcupine Ridge lookout to the Pass Lake ranger station and to Kamloops.

During the fire season, from mid May to mid September, the Pass Lake buildings were the ranger's headquarters. From there he would ride patrol routes of varying lengths, some of which took him to the other cabins. One cabin was situated on the east end of Tranquille Lake. During the fire season, a lookout was located and manned on Porcupine Ridge at 1800 m elevation, north of the Tranquille Lake cabin. The ranger kept several horses at Pass Lake as fresh mounts and pack animals to bring supplies from Kamloops. Hay was put up from the two irrigated meadows on Watching Creek.

A telephone line was strung from tree to tree through the thickly timbered areas. From Kamloops it was carried over the open grassland by poles along the Lac du Bois road between Kamloops and McQueen Lake.

An infestation of lodgepole pine beetles in 1928 killed many trees, which fell over the telephone line through the forest, making it very difficult to keep the line operating and the trail to the cabins open.

In 1931 the Railway Belt lands were returned to provincial control, except for certain portions such as the 486 ha around Pass Lake. This land and the Pass Lake ranger station buildings were transferred from the federal Department of Mines and Resources to the Department of Agriculture in 1941. The Dominion Range Experimental Substation used it when it opened in 1935, in addition to the headquarters on Mission Flats. By this time much of the abandoned telephone line had fallen down and ranchers were cutting it up to prevent injury to their stock. Some of the substation crew brought the telephone line down on horseback and used it along with barbed wire fences to reestablish telephone communication between Kamloops and Pass Lake. This operated for only a short time because the substation was closed in 1940 after the start of World War II.

The Pass Lake facilities were reopened as part of the Kamloops Range Experimental Station on Tranquille highway and Ord Road in 1947 and remain the headquarters for research on summer range.

Communication with Pass Lake has often been a challenge. The road was little more than a wagon track at the outset. It had been constructed during the homesteading era. The road was used also by those working on the Allies Mine on Cannell Creek during and after World War I and by the experimental substation. The road lost some of its challenge and interest, however, when the Department of Highways upgraded and partly relocated the road as far as McQueen Lake in the early 1970s to service the School District No. 24 McQueen Lake Environmental Centre.

For a number of years communication with Pass Lake was maintained through the use of powerful two-way radios, war surplus equipment from the air force. It was also possible to maintain communication for the Prairie Farm Rehabilitation Administration while they were operating at such places as the Pemberton Valley and McGregor River. The use of radios had to be discontinued some years later because of static caused by the increase in industry in North Kamloops. The radios were replaced by a radio-telephone through the British Columbia Telephone Company system.

In 1947 an agreement was worked out with the British Columbia Forest Service and the Tranquille Livestock Association for the management of association cattle while they were on summer range in the Pass Lake portion of the Tranquille Forest Reserve. The station personnel had management control of the cattle and were given a free hand in any management techniques they wished to try and any data they wished to record. Compensation was made for any resulting injuries or deaths to the cattle. About 58 km of trails and 18 km of drift fences were built. Along with water developments and other range improvement practices, this approach led to better

top
Pass Lake road in the spring of 1936.

bottom
Ginter Gellrich on snow survey at Tranquille Lake, 1958.

animal control and management as well as to improved accessibility and utilization of the grazing resource. The number of cattle was increased from 400 head to a maximum of 1100 in 1955. Subsequently this number had to be decreased to about 800 head because of increasing density of tree reproduction. By 1955, however, logging was increasing on the forest range, and in 1960 many of the logged areas were seeded to grass, which has been continued annually ever since. By 1972 about 400 ha had been seeded, and this area has since been increased to about 800 ha.

Miles Thomson was hired in 1947 as the first rider for the Pass Lake herd and remained with the station for 3 years. Much of the initial repair and rehabilitation work was done when he and his brother-in-law, Alan Smith, were there. Mr. Smith was a good builder and supervised the construction of the weir on Watching Creek in 1949, which was used for many years to measure the stream flow from the Watching Creek Basin.

The stream flow was monitored in connection with the snow courses, which are still recorded each winter at Pass Lake, Tranquille Lake, and Porcupine Ridge and which were established in cooperation with the British Columbia Water Rights Branch. Mr. Thomson also drove the team of Clydesdales (Molly and Kate) for draft work and haying in the Pass Lake area. At the time of the 1912 Pass Lake construction, two small areas (approximately 7 ha in total) were cleared along Watching Creek below the bridge. Ditches and a creek diversion were installed, and the areas were seeded to produce hay for the Pass Lake horses. Clarence Wright might also have used the fields when he homesteaded the flat area where Bluestone Creek drained. The range substation also took hay off the fields when it operated. When the station was reopened in 1948 the meadows were renovated, the irrigation system was fixed, and hay was taken off again until it became less expensive to haul from town.

For the first few winters the Pass Lake cabin was kept open, and Miles and Grace Thomson and Alan Smith remained in residence. Living conditions were such that the men spent much of the winter cutting wood for the stove and ice for the cooler, and taking turns stoking the fire during the very cold weather, with temperatures often exceeding −30°C. In February 1950 Tom Willis wrote: "Pass Lake has been isolated since Christmas. Drifts on the road are possibly 10 to 12 feet deep. We have daily communication with the Thomsons and they are fine." Travel to town was often difficult. When the road was drifted in with snow, the only access was by team and sleigh or on horseback. It was soon decided to close the cabins before the end of November each year.

As the road to Kamloops continued to be improved, crews could get to work at Pass Lake within a reasonable time and the bunkhouse was used less and less for overnight stays. At present the Ministry of Highways maintains the road in good condition because of logging activities and the many school buses traveling to the McQueen Lake Study Centre.

above
Miles Thomson with Molly and Kate at Pass Lake, 1948.

below
Hay rack and team at Mission Flats, 1936.

Illustration Stations

Illustration stations were selected farms and ranches on which cooperative demonstration and research projects were conducted. The Department of Agriculture entered into agreements with the owners of private farms and provided token payment to farmers for land rental and record keeping. In 1955 responsibility for illustration stations in the Kamloops region was transferred from the Agassiz Research Station, under R.M. Hall, to Kamloops, under W.L. Pringle.

Illustration stations reflected the activities of the agricultural community. The stations served as locations for test plots and management studies. Each farmer was obliged to keep records and to pass them on to the responsible supervisor. The cost of producing products such as milk, poultry, and vegetables was derived from these records. Additional records were sent to Ottawa, where they formed the basis for economic forecasting. Locally, the records were used to help make management decisions for individual farms or to provide background information for specific areas. The illustration stations program provided a valuable link with the farmers.

In 1959, when the Research Branch was formed, the illustration stations were called project farms. That year the agreements were phased out because of changing policies in the Research Branch, which brought the program to an end.

The following are names of operators and their respective illustration stations: K. McKechnie, Armstrong; E. Johnson, Armstrong; R. Stewart, Salmon Arm; B. Aten, Salmon Arm; R.C. Dunn, Chase; R. Hold, Mount Cartier; B. and V. Schilling, Darfield; O. Fletcher, 144 Mile House.

Creston Substation

Responsibility for the substation at Creston was transferred from Summerland to Kamloops in 1974. Frank Chapman was the forage scientist responsible and he remained at the Summerland Research Station until his retirement in 1976. The administrative arrangement was terminated in 1979, and the responsibility for the substation was returned to the Summerland station.

Studies at the Creston Substation included research on forage crop management and soil fertility and the evaluation of legume, grass, and cereal cultivars for the Creston area and the East Kootenays. The substation's office–laboratory building was located in the town of Creston; the office space was shared with staff from Agriculture Canada's Health of Animals and Production and Marketing branches, as well as with staff from the British Columbia Ministry of Agriculture and Food.

Research Advisory Committee

In 1965 consideration was given to closing the Kamloops Range Research Station, for reasons of austerity, and moving to the Summerland or Agassiz stations. However, at the annual meeting of the British Columbia Cattlemen's Association held in Ashcroft in July 1965, the Minister of Agriculture, the Honorable Harry Hays, committed his government to keeping the station open. He appointed a research advisory committee to the station from the British Columbia Cattlemen's Association. This is a unique committee in the Research Branch. Its objective is to bring to the attention of the station important problems in the industry that require research and to assist the staff in setting priorities for research. The committee continues to function and to provide valuable advice.

No terms of office were set originally, but in 1978 Eugene Whelan, Minister of Agriculture, suggested 3-year terms with two members to be replaced each year. The initial appointments were C.D. (Bill) Osborne (Vernon, chairman); Gordon Parke (Hat Creek); Gerard Guichon (Nicola); William Bostock (Kamloops); Huston Dunaway (Cariboo); and the station director (ex-officio).

Prairie Farm Rehabilitation Administration

Following World War II, a regional office of the Engineering Branch of the Prairie Farm Rehabilitation Administration (PFRA) was established in Kamloops, with Francis McCallum as regional engineer in charge. By 1950 they required more operating space, and therefore an agreement was entered into with the Kamloops Range Experimental Station for space at their headquarters. The PFRA built a residence and large additions to the administrative office and shop. Much information was shared with and assistance received from the engineers, especially in matters relating to water supply, dikes, and interception ditches. The association lasted until 1957, when the federal-provincial agreement with PFRA expired, after which the buildings were turned over to the station. The residence was torn down a few years later when furnace failure during a cold spell resulted in extensive damage from many broken pipes and flooding throughout the house.

Tranquille Livestock Association

Since the experimental station had virtually no forest range under its control, an agreement was reached with the British Columbia Forest Service and the Tranquille Livestock Association to give the station grazing use of the Tranquille Forest Reserve range on which the station controlled the management of the range and cattle in exchange for research data. Many management and improvement techniques were introduced and demonstrated.

The Tranquille Livestock Association was composed of a group of ranchers from the Westsyde area. The first meeting of the association was held in the grazing office, British Columbia Forest Service, Kamloops, on 8 April 1943. The first people to receive permits were H. Stephens, S. Schrauwen, C. Hale, W.H. Hardy, P.C. Inskip, O.D. Inskip, A. Jackson, H.G. Inskip, R. Hook, C.H. Schrauwen, F. Bray, J.A. Guldager, W. Wilcox, C. Stephens, J. Boyd, and D.V. Inskip. The vote was unanimously in favor of an incorporated association. The following officers were elected; president, H.G. Inskip; vice president, C.H. Schrauwen; secretary-treasurer, H. Stephens; executive, W. Wilcox, R. Hook, C. Hale, P.C. Inskip, and F. Bray.

A rider was hired for $100 a month from 1 June to 30 September. Miles Thomson was hired as a rider in March 1946. The experimental station took over the grazing management of the herd in 1947.

The Porcupine Ridge unit, which was originally within the association territory, was withdrawn from their range in 1954 by the British Columbia Forest Service and assigned to the Jamieson Creek unit. In 1954 the Kamloops Range Experimental Station advised the association that they would no longer be able to manage the range or pay for the riders on the forest range. The association accepted the decision and suggested that the station still manage the range but that they, the association, would pay for the rider. In the spring of 1955, Mr. Willis agreed to this arrangement and stated that studies would be continued and riding carried on as before with assessments made to the association.

Starting in 1958 the Tranquille farm ran their cattle in the Tranquille unit of the Criss Creek stock range, thus relieving Saul Lake unit by more than 100 head. Management changes on the Jamieson Creek, Noble Creek, and Isabel Lake units were also started in 1958. Cattle were moved farther back in June, to relieve the pressure on the lower, more easily accessible areas of these units.

In 1958 the Grazing Division of the British Columbia Forest Service investigated the possibility of grazing on Opax Mountain. It was reported that about 1200 ha on Opax were suitable for grazing. It was agreed that grazing for about 100 animal-unit months would be needed and that the area would be useful to relieve overgrazing around McQueen Lake. It was also necessary to improve the stock-watering facilities and construct about 6 km of fence. Grazing on Opax started in 1959 and has continued since. Logging has periodically taken place in the unit, which has maintained forage capabilities in spite of the closing in of the tree canopy in some locations.

The operating agreement has been revised from time to time to reflect changes in policy and in the concerns of the ranchers. Liaison has been maintained between the station and the association, however, and the latter has continued to have the use of the cabin and barn.

Black bears occasionally have been a problem on the forest range. At least five calves were killed by bears in 1952 and at least two more in 1953. Some troublesome bears were killed in 1956 and 1957. In the fall of 1958 a bear killed two calves and clawed four others.

AFTERWORD

The preceding account by Alastair McLean has given us an overview of the activities and the considerable accomplishments of the staff at Kamloops in the fields of entomology and range research. However, much remains to be done. Faced with a decline in the per capita consumption of beef, intensifying competition from other parts of Canada and abroad, and ever increasing production costs, many ranchers in British Columbia are in financial difficulty. Both intensification and diversification of production are seen as solutions to these problems. Research is the key that will help us meet the challenge of the future.

J.A. Robertson
Director

APPENDIX
Staff lists

Officers in charge

VETERINARY AND MEDICAL INSECTS LABORATORY, ENTOMOLOGY BRANCH, 1928–1954

E. Hearle, B.S.A., M.Sc., 1928–1934
G.J. Spencer, B.S.A., M.Sc., F.A.A.A.S., F.A.A.E.E., 1934–1936
G.A. Mail, B.S., M.Sc., 1937–1943
J.D. Gregson, B.A., M.Sc., 1944–1954

FIELD CROPS INSECTS LABORATORY, ENTOMOLOGY BRANCH, 1939–1954

E.R. Buckell, B.A., 1939–1949
R.H. Handford, B.S.A., M.Sc., Ph.D., 1949–1954

ENTOMOLOGY LABORATORY, SCIENCE SERVICE, 1954–1962

R.H. Handford, B.S.A., M.Sc., Ph.D., 1955–1962

DOMINION RANGE EXPERIMENTAL SUBSTATION, 1935–1939

T.P. MacKenzie, 1935–1936
E.W. Tisdale, B.S., M.S., Ph.D., 1937–1940

RANGE EXPERIMENTAL STATION, EXPERIMENTAL FARMS SERVICE, 1947–1962

S.E. Clarke, B.S., M.S., Ph.D., 1946–1947
T.G. Willis, B.S.A., M.Sc., F.A.I.C., 1947–1961

KAMLOOPS RANGE RESEARCH STATION, RESEARCH BRANCH, 1962–

R.H. Handford, B.S.A., M.Sc., Ph.D., 1962–1970
J.E. Miltimore, B.S.A., M.S.A., Ph.D., 1970–1973
D.E. Waldern, B.S.A, M.Sc., Ph.D., 1973–1978
K. Dawley, B.S.A., 1978–
A. McLean, B.S.A., M.Sc., Ph.D., F.A.I.C., F.S.R.M. (Acting Director), 1978–1980
J.D. McElgunn, B.Sc., M.Sc., Ph.D., 1980–1985
J.A. Robertson, B.S.A., M.Sc., Ph.D., 1985–

Professional staff members (employed for 2 years or more)

ENTOMOLOGY

E. Hearle, B.S.A., M.Sc., 1928–1934
T. Moilliet, 1931–1936
J.D. Gregson, B.A., M.Sc., 1932–1971
G.J. Spencer, B.S.A., M.Sc., 1934–1936, 1939–1950
G.P. Holland, B.A., M.A., D.Sc., F.R.S.C., 1936–1948
G.A. Mail, B.S., M.Sc., 1937–1943
L.C. Curtis, B.A., 1938–1939
E.R. Buckell, B.A., 1939–1949
I.J. Ward, 1939–1943
R.H. Handford, B.S.A., M.Sc., Ph.D., 1946–1970
C.L. Neilson, B.S.A., M.Sc., 1947–1950
L.C. Curtis, B.A., 1948–1969
H.R. MacCarthy, B.A., Ph.D., 1948–1955
D.G. Finlayson, B.A., M.A., Ph.D., 1948–1960
D.A. Arnott, B.Sc., 1951–1968
G.B. Rich, B.A., 1949–1973 (deceased)
F.L. Banham, B.S.A., 1951–1965
P. Wilkinson, B.A., M.A., Ph.D., 1962–1971
J. Weintraub, B.A., M.S., 1949–1952
T.K. Bourns, B.A., 1949–1952

DOMINION RANGE SUBSTATION

E.W. Tisdale, B.Sc., M.S., Ph.D., 1935–1939
T.P. Mackenzie, 1935–1939

RANGE RESEARCH STATION

T.G. Willis, B.S.A., M.S.A., F.A.I.C., 1947–1961
M.A. McDonald, B.S.A., M.S.A., Ph.D., 1947–1951
A. McLean, B.S.A., M.S., Ph.D., F.A.I.C., 1948–1986
H.H. Nicholson, B.S.A., Ph.D., 1951–1962
H. Doornenbal, B.S.A., M.S., Ph.D., 1953–1956
A.L. van Ryswyk, B.S.A., M.S.A., Ph.D., 1958–
W.L. Pringle, B.S.A., M.S., 1952–1965
W.A. Hubbard, B.S.A., M.S., 1955–1975
J.D. Beaton, B.S.A., Ph.D., 1955–1957
L.S. Marchand, B.S.A., M.S., 1958–1965
S. Freyman, B.S.A., Ph.D., 1966–1969
W. Majak, B.Sc., M.Sc., Ph.D., 1972–
K. Broersma, B.S.A., M.Sc., 1973–1979
D.A. Quinton, B.S., Ph.D., 1976–
D.G. Stout, B.S.A., M.Sc., Ph.D., 1977–

Support staff members (employed for 2 years or more)

ENTOMOLOGY

(We apologize for a possibly incomplete list, but the personnel records for the Entomology Laboratory were not available.)

Crew leader

William Huxley

Secretaries and clerks

E. Berwick
A. Davis
R. Dunningham
P. Gee
M. Hall
V.E. Hamilton
G.M. Peters
I. Pillar
E.D. Richards
M. Rigby
M. Skene

Other staff members

G. Armstrong
B. Baird
M. Becker
I. Bergis
G. Bowers
A. Brooks
F. Cameron
J.H. Carson
S. Clavert
P. Darling
E. Day
R. Dean
J. Deeble
D. Fisher
K. Hartnell
G. Hatton
S. Hearle
H.R. Ireland
J. Lidstone
H. McIntyre
T. Nishimura
M. Prisseski
B. Ramsden
B. Robertson
E. Skene
A.N. Smith
K.M. Sutherland
D. Williams
M. Wilson

LABORATORY OF HYGIENE, DEPARTMENT OF PENSIONS AND NATIONAL HEALTH

F. Beebe
A. Campbell
M. Driver
R. Gibbons
S. Hall
W. Hogg
F. Humphreys
F. Lawrence
N. MacDonald
D. Magee
J. Poole
V. Powers
E. Smith
G. Williams

DOMINION RANGE EXPERIMENTAL SUBSTATION

J. Brown
R. Doig
D. Elliott
B. Godlonton
D.K. Taylor

RESEARCH STATION

Administration

W.B.G. Holliday, 1956–1976
S.E. Margetish, 1976–1980
P.A. Dickson, B.S.A., 1980–1984
K.J. Robinson, 1985–

Crew leaders

L. Cooper, 1947–1951
O.N. Selbee, 1951–1967
G. Davidson, 1967–1975
D.W. Beaton, 1976–1977
L.O. Haupt, 1978–

Secretaries and Clerks

G. Woodward, 1948–
J. Peters, 1950–1952
S. Marriott (Buchanan), 1953–1957
B. Nash, 1952–1953
L.M. Barnhardt, 1957–1971
M. Sheridan, 1956–1969
J. Smedley (Haupt), 1969–1974
T. Lammers, 1974–1978
P.A. Dickson, B.S.A., 1974–1980
R. Robinson, 1978–1983
C.A. Schneider, 1979–
D.M.T. Kemp, 1980–

Other staff members

M. Thomson, 1947–1950
A. Smith, 1947–1950
A.J. Davoren, 1947–1973
G. Davidson, 1948–1975
H. Handschuh, 1948–1973
R. Dickson, 1948–1950
O. Selbee, 1948–1967
G.A. Gellrich, 1950–1966
J. Fleissner, 1952–1966
J. Melville, 1953–1956
I.E. Tribe, 1954–1975
B.O. Nelson, 1955–1967
E. Pellizon, 1956–1969
L.S. Marchand, B.S.A., M.Sc., 1956–1958
C. McMillan, 1956–1958
B. Mourier, 1957–1962
L.A. Schmidt, 1958–
L. Demers, 1958–1967
A.E. Cork, 1958–1971
J.R. Wynn, 1959–1973
J. Pape, 1959–1975
E.J. Proctor, 1960–1973
T.G. Harvey, 1961–1977
L.O. Haupt, 1961–
L. Stroesser, 1965–
E. Pagan, 1966–
W. Peters, B.S.A., 1966–1969
G.L. Swenson, 1967–1978
W.T. Batchelor, 1967–1972
W. Willms, B.S.A., M.Sc., 1971–1974
C.M. Kalnin, 1972–
B.M. Brooke, B.Sc.(Agr.), M.Sc., 1974–
H. Pardoel, 1974–
R.E. Tucker, B.Sc.(Agr.), M.Sc., 1974–1980
G.C. Kidd, 1975–
R.E. McDiarmid, B.Sc., 1975–
R.B. Reaney, 1975–
V.R. Sayers, 1976–1983
T. Nakashimada, 1979–
S.A. Garvey (Vickers), B.Sc., 1980–
S.J. Wikeem (Gale), B.Sc.(Agr.), 1981–
H.E. Douwes, B.Sc.(Agr.), 1981–